



**University of
Zurich**^{UZH}

**Zurich Open Repository and
Archive**

University of Zurich
University Library
Strickhofstrasse 39
CH-8057 Zurich
www.zora.uzh.ch

Year: 2011

Working capital management in the Swiss chemical industry

Seeger, S ; Locker, A ; Jergen, C

Abstract: The performance of Swiss based chemical and pharmaceutical companies regarding their working capital management and its underlying components, namely accounts receivable, inventories and accounts payable differs over time and between the single firms. The calculation of a cash potential for the year 2008 shows that 17 billion CHF is tied up in the companies' balance sheets if they would realise the Swiss best practice performance. It has also been shown that in recent years Swiss chemical and pharmaceutical companies have a considerably higher working capital level compared to their European and US peers. The managerial implications for the achievement of best practice are the awareness of the top management, efficient processes on the operating level as well as an enhanced collaboration within the company as well as throughout the entire supply chain.

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-58453>

Journal Article

Published Version

Originally published at:

Seeger, S; Locker, A; Jergen, C (2011). Working capital management in the Swiss chemical industry. *Journal of Business Chemistry*, 8(2):87-98.



Practitioner's Section

Working capital management in the Swiss chemical industry



Stefan Seeger*, Alwin Locker** and Christian Jergen***

* Universität Zürich, Physikalisch Chemisches Institut, Winterthurerstrasse 190, CH-8057 Zürich, Switzerland, sseeger@pci.uzh.ch

** Soltar AG, Eichstrasse 25, CH-8045 Zürich, info@soltar.biz

*** Universität Zürich, Physikalisch-Chemisches Institut, Winterthurerstrasse 190, CH-8057 Zürich Switzerland

Introduction

The performance of Swiss based chemical and pharmaceutical companies regarding their working capital management and its underlying components, namely accounts receivable, inventories and accounts payable differs over time and between the single firms. The calculation of a cash potential for the year 2008 shows that 17 billion CHF is tied up in the companies' balance sheets if they would realise the Swiss best practice performance. It has also been shown that in recent years Swiss chemical and pharmaceutical companies have a considerably higher working capital level compared to their European and US peers. The managerial implications for the achievement of best practice are the awareness of the top management, efficient processes on the operating level as well as an enhanced collaboration within the company as well as throughout the entire supply chain.

The need for operational excellence

The chemical and pharmaceutical sectors are facing significant changes: the ongoing consolidation in the supplier, competitor and customer base, as well as the proceeding globalization is posing numerous challenges. Moreover, the increasing price competition and rising feedstock prices bring margins under pressure and force the chemical and pharmaceutical firms to seek for ways to oppose those trends. Working capital optimizations offer various opportunities, both in the short as well as in the long run. The working capital mainly comprises accounts receivable, inventories and accounts payable. These three balance sheet entries are the immediate financial picture of a company's operating activities. At this point the relevance of the working capital becomes obvious: it lies at the interface between a firm's

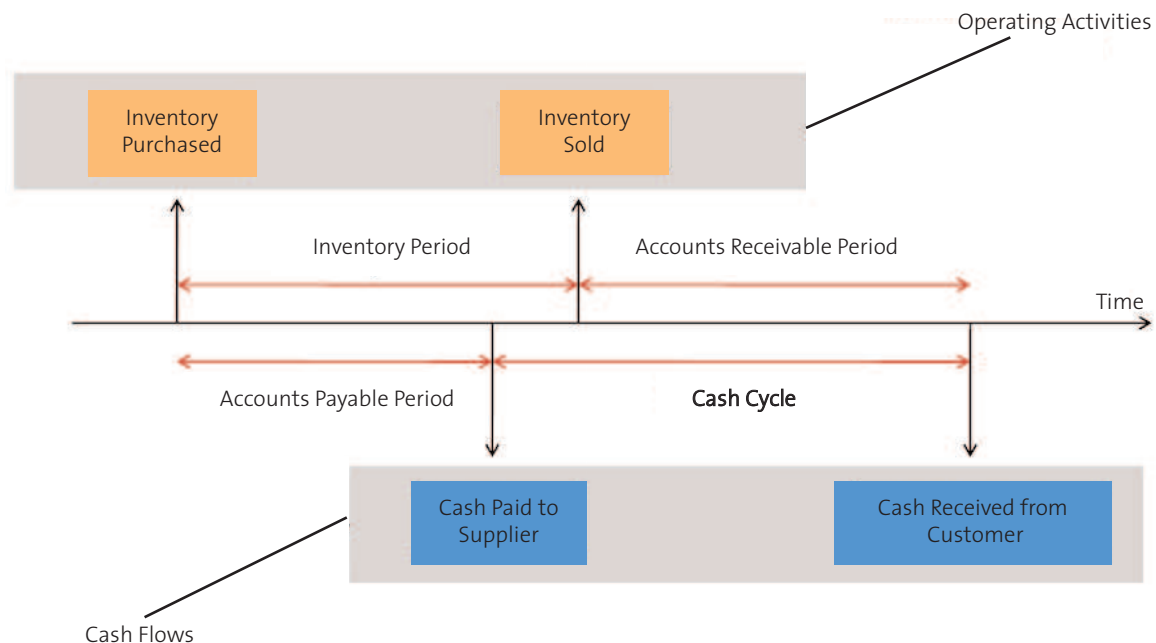
daily operations and the short run funding needs of a company. Improvements within the working capital levels thus offer various benefits, like lower capital requirements and lower capital costs, but also optimized supply chains and operational excellence. Eventually, these changes lead to higher profitability and to competitive advantages.

The origin of working capital

The operating cycle is composed of the inventory period and the accounts receivable period (Ross et al., 2008). The inventory period is the average amount of time the inventory is held, whereas the receivables period is the average number of days it takes from the sale of the goods until the cash receipt from the customer. The accounts payable period, in turn, is the average time span between the purchase of the raw materials and the cash outflow to the supplier.

The difference between the operating cycle and the accounts payable period is called the cash cycle. It is the time period it takes on average from the cash outlay by the firm to the suppliers to the cash inflow from the customer. In other words, it shows the financing needs of a company regarding the operating activities, since part of the inventory and accounts receivable have to be financed by either borrowing money or holding a liquidity reserve (Farris and Hutchison, 2003). The amount of this additional financing depends on the length of the cash cycle: the longer the cash cycle is, the higher are the capital requirements and vice versa (Boer, 1999). This is due to the fact that the longer a firm has to wait after the cash outflow to the supplier to the cash inflow from the customer, the longer it has to finance the operations through other sources.

Figure 1 Operating and cash cycle



Source: Own elaboration, based on Ross et al., 2008

The connection between the operating activities and the financing needs of a company becomes more obvious when considering its impacts on the balance sheet. The length of the operating cycle determines the actual inventory and accounts receivables levels and hence considerably affects the amount of current assets which is held by the company. On the other hand, the length of the accounts payable period has a substantial impact on the level of a firm's current liabilities, namely the amount of accounts payable. The capital needs, with respect to the operating activities are finally determined by taking the difference between the sum of the accounts receivable and the inventories minus the accounts payable. This difference is called the net working capital and corresponds to a company's short run financing needs (Wagner and Locker, 2008).

Measuring the working capital

Various ratios can be used in order to evaluate a company's short term assets and liabilities. Well-known examples are the liquidity ratios like the current and the quick ratio (Volkart, 2006). These ratios focus on a firm's short-term solvency, since they provide an indication of how well the short-term liabilities are covered by short-term assets. In other words, they indicate

whether a company is able to meet its currently maturing financial obligations by its currently maturing short-term assets, and hence examine a firm's liquidity.

In order to incorporate the dynamic nature of a firm's business the working capital ratios and the cash cycle are becoming more popular (Losbichler and Rothböck, 2008). The Days Working Capital ratio (DWC, also called cash conversion cycle or cash-to-cash cycle) expresses the cash cycle in terms of days, and is calculated based on the lengths of the underlying periods, which are depicted in Fig. 1.

The days sales outstanding ratio (DSO) converts the receivables period into days (Brealey and Myers, 2005):

$$DSO = \frac{\text{Accounts Receivable}}{\text{Sales}} * 365 = \frac{\text{Accounts Receivable}}{\text{Average Daily Sales}}$$

The DSO measures how many days it takes on average from the sale of the goods until the customers pay their bills. A high DSO leads to a longer cash cycle, and hence also to higher working capital levels.

The days inventory outstanding (DIO) denotes the average time span in terms of days for a good to be purchased as raw material, converted into the finished good, and finally sold to the customer:

$$\text{DIO} = \frac{\text{Inventory}}{\text{Sales}} * 365 = \frac{\text{Inventory}}{\text{Average Daily Sales}}$$

The sum of the DSO and DIO result in the operating cycle. Therefore, an increase in these ratios leads also to an increase in the cash cycle.

The day's payable outstanding (DPO) expresses the average number of days a company waits until it pays its suppliers:

$$\text{DPO} = \frac{\text{Accounts Payable}}{\text{Sales}} * 365 = \frac{\text{Accounts Payable}}{\text{Average Daily Sales}}$$

Since the cash cycle is the difference between the operating cycle and the payables period, an increase in the DPO results in a shorter cash cycle. Hence, the later the cash outflows to the suppliers occur, the less capital is needed to finance the operating activities of a company.

The Days Working Capital is calculated by putting these ratios together:

$$\text{DWC} = \text{Days Sales Outstanding} + \text{Days Inventory Outstanding} - \text{Days Payable Outstanding}$$

The cash conversion cycle thus measures the average time span between the cash outflow for the purchase of inventories and the cash inflow from the collection of receivables.

The importance of an efficient working capital management is confirmed by several studies (e.g. Jose et al., 1996 or Shin and Soenen, 1998), which show that a shorter cash cycle leads to higher profitability and rising share prices thus, resulting in an increased enterprise value.

The working capital survey of the Swiss chemical industry

The survey is aimed to reveal the working capital performance of Swiss based chemical and pharmaceutical companies within recent years. Moreover, general trends and peculiarities of the chemical sector are presented and the corresponding drivers and causes are identified. In addition to this quantitative approach, a questionnaire was forwarded to all investigated companies in order to evaluate the awareness and relevance of an efficient working capital management for the firms and the responsible executives.

Research methodology and scope

The ratios *Days Sales Outstanding*, *Days*

Inventory Outstanding and *Days Payable Outstanding* represent the metric for the assessment of accounts receivable, inventories and accounts payable, respectively. The *Days Working Capital* ratio is considered as measure for the overall examination of the working capital levels, i.e. providing the collaborative working capital view. Year-end balance sheet entries have been used for the calculations of all ratios.

The sample consists of 18 companies that are listed at the SIX Swiss Exchange and headquartered in Switzerland. Furthermore, firms were chosen according to the Standard Industrial Classification (SIC) system: only corporations classified as *Chemicals & Allied Products* (SIC Code 2800) and its sub-segments were considered. Based on those requirements, the study includes the following eighteen firms:

Actelion Ltd., Bachem Holding AG, Ciba AG (now part of BASF), Clariant AG, CPH Chemie & Papier Holding AG, Dottikon ES Holding AG, Ems-Chemie Holding AG, Galenica AG, Givaudan SA, Gurit Holding AG, Lonza Group AG, Novartis AG, Quadrant AG, Roche Holding AG, Acino Holding AG (formerly Schweizerhall Holding AG), Siegfried Holding AG, Sika AG, Syngenta AG

Outliers (mainly start-up companies) have been excluded in order to provide a more accurate view.¹ The five firms below are not considered for the survey:

Arpida AG, Basilea Pharmaceutica AG, Cytos Biotechnology AG, Santhera Pharmaceuticals Holding AG, Speedel Holding AG

The starting data, namely the year-end figures of the accounts receivable, inventories, accounts payable, and sales, was taken from the THOMSON REUTERS OneBanker data base. The working capital performance metrics are thus calculated based on publicly available financial statements issued by the companies. Although the study focuses on firms headquartered in Switzerland, the individual figures correspond to their respective global values.

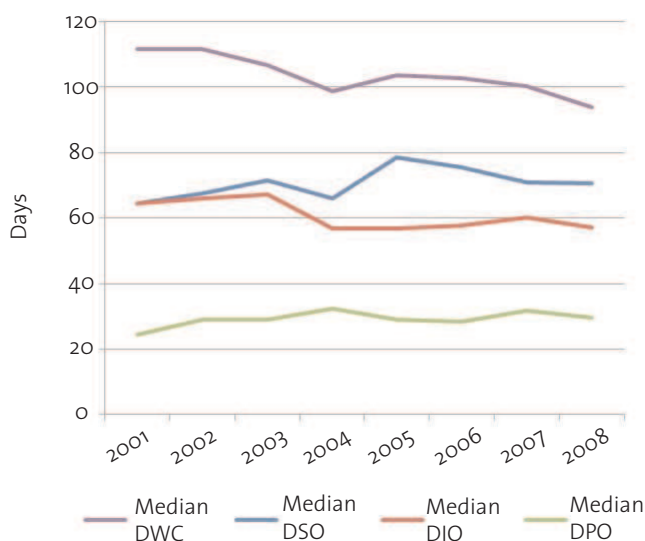
values.

Receivables performance

There is no clear trend regarding receivables performance within the last eight years: the Days Sales Outstanding (DSO) median followed a very volatile path and there have been great

¹) Start-up companies usually are quickly expanding and have less constant sales volumes. Therefore, working capital levels and turnovers sometimes vary considerably from year to year, and hence also the measured ratios (DSO, DIO, DPO and DWC). Furthermore, since those firms are growing very fast, the processes are not very harmonized and thus not suited for comparisons with established companies.

Figure 2 Overview ratio evolution 2001 - 2008



Source: Thomson Reuters, based on publicly available financial statements

fluctuations even between certain single years, as displayed in Fig. 2. Overall, the DSO median has deteriorated within the last eight years by 5 days from 65 days in 2001 to 70 days in 2008. That corresponds to an increase of 8%.

The greatest increase occurred during 2005, when the median went up by 19%, in accordance with the fact three quarters of the firms displayed a higher DSO value in 2005 compared to 2004. In the light of this industry-wide deterioration, it seems that there existed external causes which put pressure on the entire sector. Actually, the economic circumstances were hard in the years 2000 to 2005: the Swiss economy was suffering heavily from the impacts and aftermath of the Dotcom bubble. The recovery of the economy in the third quarter of 2005 is likely to be the cause of the rise in DSO. The chemical and pharmaceutical companies have probably tried to achieve more sales volume and to bind their customers by agreeing to less rigorous payment terms and hence longer payment periods.

The trends towards consolidation and globalization supposedly are other factors that have caused stagnating or even rising DSO figures: the consolidation phase has led to bigger customers in terms of sales volume. It is likely that the power has shifted to the buyers and that more pressure is put on the suppliers in order to negotiate longer payment terms (Budde et al., 2006). Moreover, the globalization has led

to a geographical shift of the customer base, mainly to Eastern European and Asian countries. That entailed changing customer relationships and threatened established supply chains. Probably, the management did not want to endanger those sensitive relationships by forcing stricter payment terms.

Inventory performance

A lean inventory leads to less tied-up capital and less inventory costs. Therefore, a lower Days Inventory Outstanding (DIO) ratio leads to less capital requirements and higher profitability. The Days Inventory Outstanding (DIO) median value has improved over the whole period by 11%, since it has decreased by 7 days from 64 days in 2001 down to 57 days in 2008. Despite this respectable overall lowering in inventory levels, the study results imply no constant and ongoing improvements for the whole sector: in fact, the DIO median has risen in years 2001 to 2003, substantially declined in year 2004, but has stayed almost unchanged until 2008. However, there has been a decrease of 3 days in 2008, which at least shows a positive trend in the recent past.

As mentioned above, the economy was slowing down in years 2001 to 2004, and it is likely that this downturn has led to an optimization within the inventories. The companies reduced its stocks in the light of

decreasing sales and bad business prospects. That led to declining DIO values across the entire industry. However, although the economy recovered in the second half of 2005, the DIO median shows no considerable increase. The companies obviously have been able to increase their sales by keeping the production lean. In 2008, the decrease in the median might be again partly due to the bad business outlook.

Furthermore, a study of the consulting company KPMG (KPMG, 2008) has stated that most of the improvements regarding the inventory management were most likely achieved through a

"[...] continual investment in the manufacturing process to improve yields, remove bottlenecks and accelerate production."

KPMG mentions in the same report that the companies have tried to transfer the responsibility of the raw material inventory to the suppliers. That happened for example through the creation of consignment stocks², and hence led to lower inventory levels in the firms' balance sheets.

The two main trends stated in the DSO chapter, consolidation and globalization, also give rise to new challenges with regard to the inventory management. Supply chains are becoming more and more international, e.g. through the outsourcing of certain activities or the global purchase of raw materials, resulting in a lengthening of the supply chains (Christopher, 2008). Moreover, new supply chains arising from mergers and acquisitions have to be developed and integrated.

Another impact on the inventory performance originated from the constantly rising raw material prices, like crude oil, natural gas and petrochemicals. Not surprisingly, the chemical industry suffered more from increasing oil prices than other industries. The high oil dependency lies in the nature of the chemical and pharmaceutical production: oil is the basis of virtually every organic product. A price inflation in raw materials leads to higher inventory levels in monetary terms, because the same amount of stock keeping units has a higher value.³ The effect of the rising feedstock prices on the inventory performance, measured by the DIO, partly depends on a company's ability to pass on these higher costs to its customers, namely through price increases of the products (Ernst & Young, 2008). Since the DIO compares

the inventory level with the daily sales, the relationship becomes apparent: only if the sales volume increases equally to the inventory level, in relative terms, the DIO will stay the same. However, that not only requires a full shift of the higher costs to the customer, but also the same sales volume in terms of units despite the price increase. It is likely that most of the companies have not been able to fully pass on those increases to their customers in the short-run.⁴ Therefore, the rise in feedstock prices most probably had a negative influence on the industry's inventory performance, except for the year 2008. On the other hand, the considerable fall in the oil price in 2008 might partly have caused the decreasing DIO figures for the median.

Payables performance

In contrast to the DSO and the DIO, a higher Days Payable Outstanding (DPO) ratio leads to lower net working capital levels. In other words: rising DPO ratios mean an improvement, whereas falling DPO ratios indicate deterioration.

The DPO median exhibits an overall upward trend, with a temporary downfall in the years 2005 and 2006. Overall, it has increased by 5.5 days or 22% from 24 days in 2001 up to 29 days in 2008. In the year 2008 however, the median again has fallen by 2 days, which means a negative tendency for the recent past. The economic circumstances seem to play an important role also with regard to the payables performance. The median increases in years 2001 to 2004, which leads to the assumption that the companies have stretched their accounts payable by later payments to their suppliers. This is in accordance with the fact that the median has declined in 2005, when the economy experienced an upturn. The median decreased in 2008 after an increase in 2007. Since the raw material prices have risen sharply in 2007 and the first half of 2008, it is likely that the companies have recently focused on the price rather than on the payment terms.

As mentioned above, the sector has experienced a consolidation and globalization phase (Jakobi, 2001). Whereas those trends can threaten the receivables performance, it also provides chances regarding the payables performance. The increasing size of the firms within the chemical and pharmaceutical

2) Inventories held in a consignment stock belong to the supplier until the customer uses them. In other words, the stock legally belongs to the supplier, but it is held by the customer. The customer has the advantage that the stock is stored at the production site, but the inventories do not appear in its balance sheet.

3) This is true for the raw material fraction of the inventory. The valuation of the WIP and finished goods may also depend on market prices.

4) Since a firm's negotiation position is enhanced when the raw material prices are staying at higher levels, it is more likely that the higher costs can be passed on to the customers in the long run. The effect on the inventory performance should therefore be mitigated in the long term.

industry, resulting from various mergers and acquisitions, increases the supplier's dependency on the customer, and leads to more power for the buying firm with regard to the negotiations of payment terms.

Nevertheless, the overall rise is probably also partially caused by the price inflation of the raw materials. The mechanism is the same as for the DIO ratio: the increasing feedstock prices lead to higher accounts payable. Since it is not likely that the entire increase in raw material costs has been transferred to the customers, the rise in DPO is probably partially caused by the rising feedstock prices.

Collaborative working capital management performance

The Days working capital (DWC) ratio is used as a measure of the overall working capital management performance. The DWC combines the values of the different working capital components (DSO, DIO, and DPO), and serves as a measure of a company's net working capital level in general.

The DWC median shows a clear downward trend within the last eight years and hence, the working capital levels have been lowered overall. Since 2001, the industry's median has decreased by 17.5 days from 111 days in 2001 to 93.5 days in 2008, an improvement of 16%. This is supported by the fact that eleven firms out of eighteen exhibit a lower Days Working Capital ratio in 2008 than in 2001.

Since the collaborative working capital measure DWC is composed of the underlying components' ratios DSO, DIO and DPO, the DWC evolution is the result of the evolution of the single underlying ratios. Hence, changes in DSO, DIO or DPO cause a change in DWC. As described above, the economic situation has a big influence on the single components of the working capital. The same is true for the DWC median, which has decreased during the years 2001 to 2004, when the economic circumstances were difficult. It increased in 2004 when the economy was recovering, and declined again in the years afterwards. This connection implies that the firms are focusing on working capital management in times of difficult economic conditions and somehow neglect an efficient working capital structure in times of an upturn. Since it is harder to generate profits or obtain credits when the economy is slowing down, companies try to run their businesses by internal funding and improve the operating results

through even stricter cost reduction programs. On the other hand, the firms focus more on market share and gaining sales volume during promising economic outlooks, and hence set different priorities, which leads to a losing focus on the cash cycle.

However, the amounts of net working capital have been lowered again after the achievement of the new production level in the years 2006 and 2007, when the firms have been accommodating with the new output level. In 2008, the DWC median once more declines considerably, as the economic forecasts became pessimistic due to the starting financial crisis. It seems that the firms again tried to mitigate that impact partly by improving their working capital balances.

Other drivers for a general improvement with regard to the working capital emerge from changes of traditional business circumstances: especially the pharmaceutical sector has historically displayed high profit margins and strong balance sheets, what usually has led to a comparably facile access to new funds (Sage 2009). Furthermore, pharmaceutical companies tended to hold high safety stocks, since stock-outs of essential drugs lead to a bad image and the loss of the customers' trust. In the light of these circumstances, pharmaceutical companies traditionally have operated with comparably high working capital levels and have experienced low pressure for improvements within this area. However, that comfortable state has been jeopardized in recent years by decreasing margins, reduced growth opportunities and less productive outcomes in drug discoveries. These unfavorable developments have forced the pharmaceutical firms to seek for ways to oppose those trends.

The picture is similar for the chemical industry, which is facing on one hand rising costs, mainly due to the increase of the raw material prices (Budde et al., 2006). On the other hand, the chemical sector experiences a permanent price pressure, originating from increased competition, for example through the entrance of new, mostly Asian players. Therefore, the chemical industry is struggling heavily with maintaining the actual level of return on investment (ROI). It is likely that those external pressures have caused the companies to seek for new opportunities to counter these negative trends. Since an optimization of the working capital and its related practices leads to higher access to cash⁵, lower costs, lower capital requirements and also to higher sales growth (Losbichler and Rothböck,

5) For example through a better access to credit and through earlier cash inflows.

2008), it is likely that chemical and pharmaceutical firms have tried to take advantage of that leverage in recent years. As mentioned above, the pharmaceutical sector historically operates with high working capital levels. It is therefore very likely that they have tried to enhance their performance through leaner working capital practices.

This conclusion is supported by a study concerning the life sciences industry carried out by the consulting firm Ernst & Young (Ernst & Young, 2009), which states that *"within the last year (2008, note from the authors), the number of initiatives launched by companies to free up cash has risen sharply."* Last but not least, the further emergence and development of IT systems have enabled companies to improve their data management and enhance their processes and planning accuracies. Due to new and better possibilities arising from the progress in the information technology, the companies are provided with tools for more accurate and resilient planning and controlling outcomes.

The companies' perspective

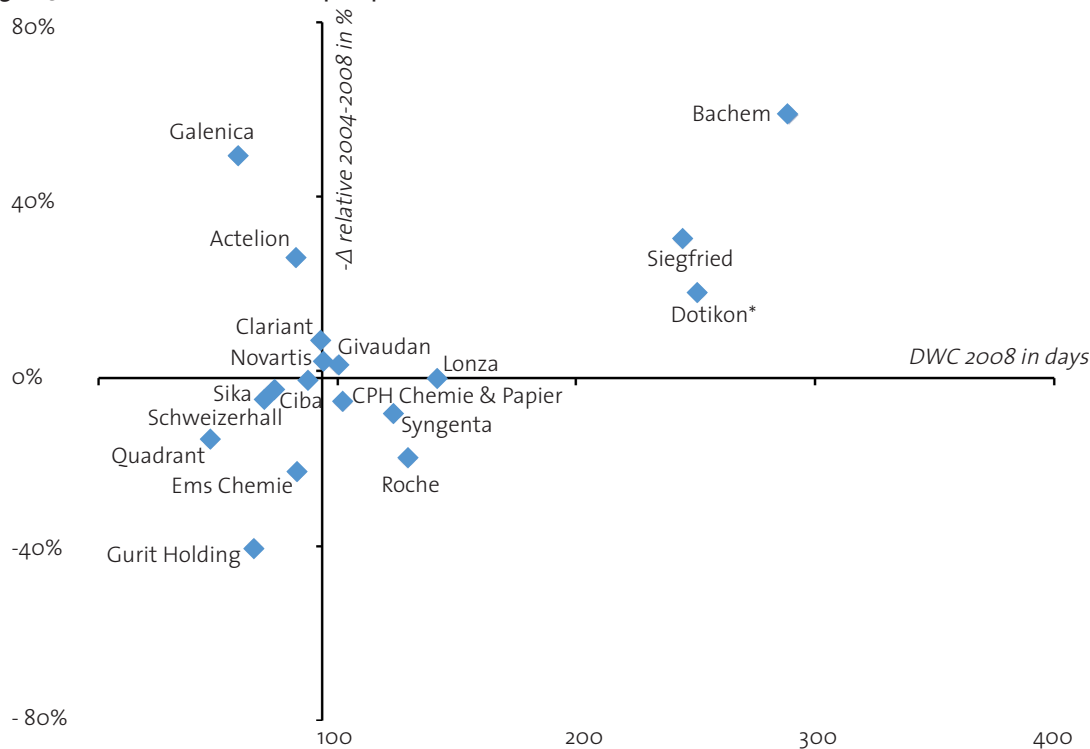
The discussion of the results so far has

focused on the entire sector. The working capital levels for the individual companies are depicted in Fig. 3. In the DWC portfolio, the Days Working Capital (DWC) ratio in 2008 is compared to the relative change of the DWC since 2004. The interception of the axes is at the DWC median of 2008, at 94 days, and at the median of the changes since 2004, at -1.6%.

Therefore, companies lying in the first quadrant have a high DWC ratio in 2008 and have shown a change less than the industry's median within the last five years. In the opposite quadrant, the third one, firms within that quadrant have a comparably low DWC value in the year 2008, and have still been able to further reduce their accounts receivable relative to sales volume. The second quadrant includes corporations that have a DWC lower than the industry's median in 2008, but which have experienced a change less than the median within the last five years. Finally, companies within the fourth quadrant have a DWC which is higher than the industry's median in 2008, but those firms have reduced their DWC since 2004 to a higher extent than the median value.

It becomes evident that Quadrant, Gurit, Ems Chemie, Schweizerhall and Sika are not only among the companies with the lowest DWC in

Figure 3 DWC Portfolio: Current vs. past performance



Source: Own elaboration, based on publicly available financial statements

* For Dottikon, the change since 2005 is considered, because it went public in 2005

2008, but show also the biggest improvement within the last five years. Bachem, Siegfried and Dottikon, on the other hand, have high working capital levels relative to sales in 2008, and have even seen deterioration compared to 2004. They are thus located at the upper right side of the portfolio.

The amazingly great gap in DWC between the companies in 2008 of 242 days reveals huge differences in working capital management within the industry. The fact that ten out of eighteen companies have been able to reduce their working capital level in the last five years confirms that it is possible to take advantage of the potential which is lying in the accounts receivable, inventories and accounts payable.

Cash potential amounts to CHF 17 billion in 2008

As shown above, the firms within the chemical sector hold different levels of working capital relative to their respective sales volume. By lowering those current assets or increasing the short-term liabilities, companies can reduce their capital and free up cash. The cash potential is calculated by comparing the average net working capital to sales ratio of companies within the first quartile with the actual net working capital to sales ratio of the firms of the upper three quartiles. The companies in the first quartile (in this case Quadrant, Galenica, Gurit, Schweizerhall and Sika) are taken as reference values and hence have no cash potential in this calculation. All other companies are compared to the average of the 25% best performing firms, which amounts to 17.2% for the year 2008. The difference between a firm's NWC to sales ratio and the benchmark taken from the first quartile results in the company's cash potential. It is thus that amount of cash which would be freed up if the company reduced its NWC relative to sales to the average of the first quartile, instead of holding the actual level. For the entire sector, the cash potential amounts to CHF 17 billion in 2008, this is equal to 13.2% of annual sales of the companies in the upper three quartiles.

Performance compared to European and US competitors

Swiss chemical and pharmaceutical companies are operating in a global environment and hence are facing global competition. It is therefore reasonable that they are not only

compared to each other, but also to the performance of chemical and pharmaceutical firms based in Europe and the US.

The median values for the different ratios and regions are depicted in Fig. 4. It becomes apparent that the Swiss sector displays higher median values than the European and the US sector for all the ratios and years, except for the DPO. With regard to the DSO median, the gap amounts to approximately 20 days to the US median and 10 days to the European median in 2008. The difference between the Swiss DIO median and the US median is 16 days, and 11 days between the Swiss and the European one. The Swiss companies are only performing better than the US ones regarding the DPO median: the Swiss median lies 4 days above the US one, but is still 2 days lower than the European one.

The performances in the single components, especially with regard to the DSO and DIO ratios, lead also to a comparably high Days Working Capital median of 94 days in 2008. It is 19 days higher than the European median, and 21 days higher than the US median.

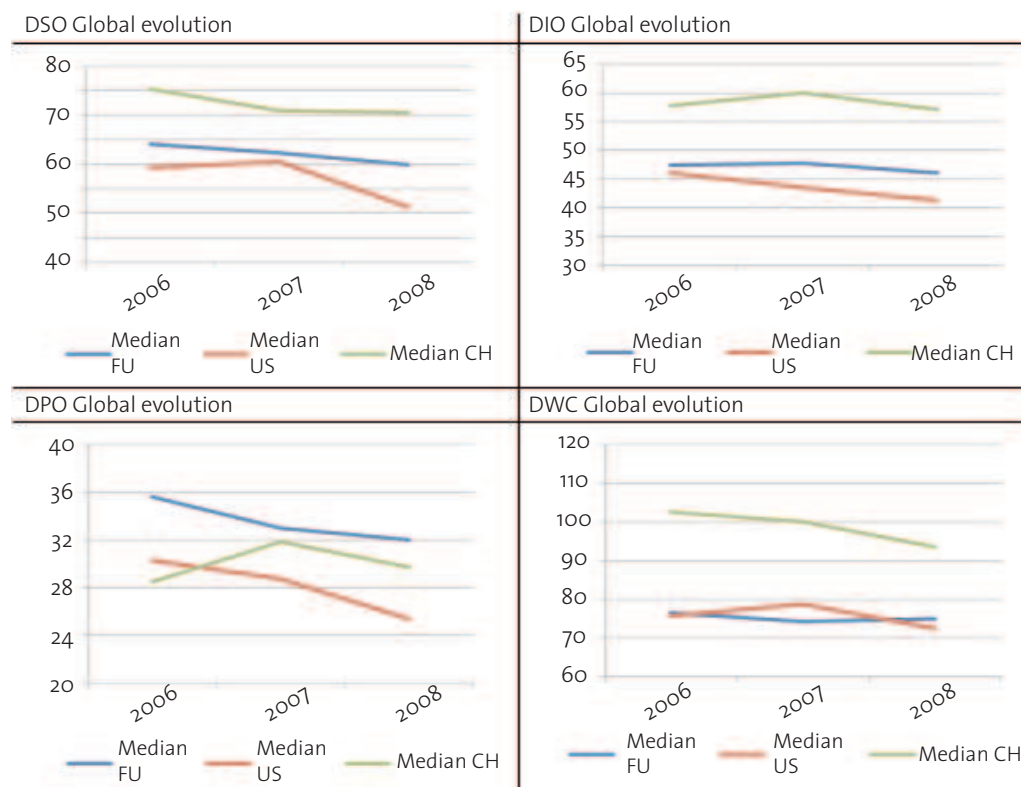
This comparison shows that Swiss based companies are performing on a higher Working Capital level than their European and US competitors on a median basis. In fact, the median Swiss company holds almost one fourth more net working capital relative to the sales volume than its US counterpart, and one fifth more than its European counterpart. Hence, Swiss based companies are keeping considerably higher amounts of tied-up capital that is related to the working capital within their balance sheets. That in turn means that Swiss companies are operating less efficiently than its foreign competitors with regard to their short-term assets and funds and that they could generate a higher shareholder value by adapting the working capital practices of US and European firms (Losbichler and Rothböck, 2008).

Results of the questionnaire

In addition to the quantitative examination of the working capital performance through the analysis of the companies' financial statements, a questionnaire was forwarded to each company (except for Ciba⁶) to obtain some qualitative data. The aggregated results of that survey are intended to give a bigger picture of the relevance of the working capital management for the firms. Nine companies out of seventeen answered the questionnaire.

6) Ciba has been acquired by BASF in 2008, and is fully integrated since April 2009.

Figure 4 Chemical and pharmaceutical industry performance in Europe, the US and Switzerland



Source: Own elaboration, Swiss values are based on publicly available financial statements, US and European values are based on REL/CFO Working Capital Survey 2009

The analysis of the received answers shows that the firms are well aware of the importance and impact of the working capital management on the overall performance. Furthermore, the working capital management is seen as a decisive factor and an important driver of the company's present and future performance. Some of the most distinct answers are presented below.

As shown in Fig. 5, the general importance of WCM for the success of the company is considered as relatively high with an average rating of 4.29 on a scale ranging from 1 to 5, with a higher number representing higher importance. The firms see the highest impact on the cash management: eight out of nine companies have stated that the WCM is very important for the cash management. This certainly makes sense, since changes within the working capital directly influence the timing of the cash flows and hence a firm's cash balance.

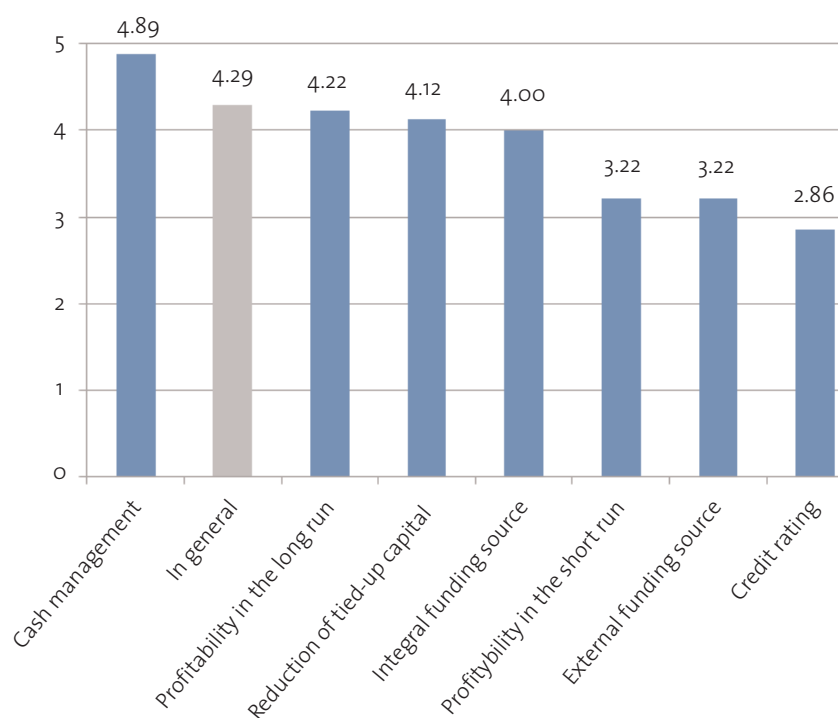
Another big influence is seen in the profitability in the long run and the reduction of tied-up capital. Those two are closely related to each other, since (all other things being equal) less capital leads to a higher profitability. On

the other hand, the firms see a lower impact on the profitability in the short-run, with an average rating of 3.22 out of 5. This might reflect the fact that the actions taken for the improvement of the working capital first cause certain one-time costs and the benefits of the reduction in the WC levels occur later, in the long-run.

Concerning the potential for improvements, the companies were asked to rate the different levels of potential again on a scale from 1 to 5. The higher the number in the rating, the higher is the potential seen by the companies.

With seven companies out of nine stating that they see a potential of 3 and higher, most of the firms detect opportunities for improvements within the working capital management in general. Whereas the companies see the highest potential in accounts receivable and inventories, with an average potential of 4.25, the lowest potential is seen in accounts payable, with an average of 2.875, as depicted in Fig. 6. This is consistent with the rating of the importance of WCM shown in Fig. 5: the firms have stated that WCM plays a more important role as an internal funding source than as an external funding source.

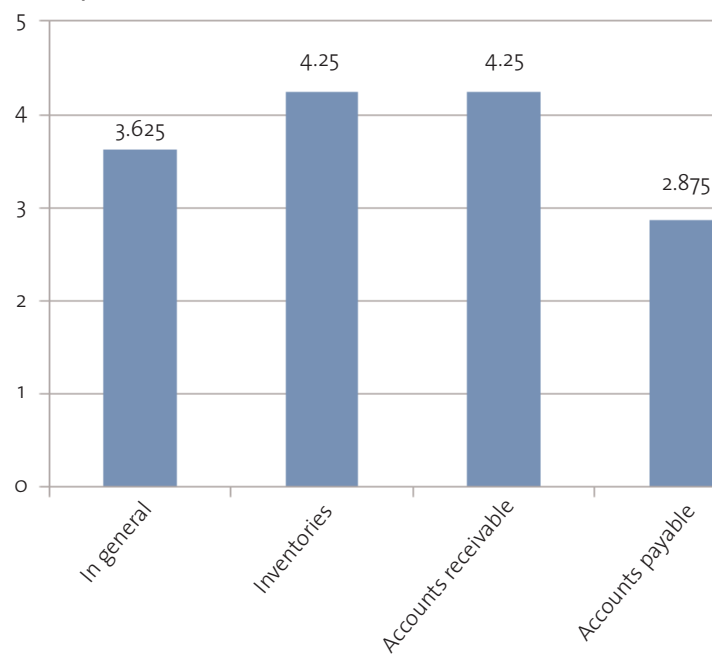
Figure 5 Importance of the WCM concerning different Issues



1= not important at all, 5 = very important

Source: own elaboration, based on answers given by companies

Figure 6 Opportunities for improvement



1= not important at all, 5 = very important

Source: own elaboration, based on answers given by companies

Managerial implications

The very basic prerequisite of every optimization within the working capital is the management's awareness of the benefits arising from the improvements and the corresponding will to implement the necessary actions and to conduct the appropriate changes (Randall and Farris, 2009). The commitment is thus a crucial factor in the implementation of the appropriate activities. Moreover, also the time period of the improvement process highly relies on the willingness of the top management: the higher the commitment and importance given by the top level executives, the earlier reductions in net working capital occur. Besides being a top priority at the upper level, it is essential that the responsible divisions and managers are informed and instructed appropriately. The best strategic decisions do not lead to the desired outcome if they are not implemented on the operational level. Therefore good communication is vital for the achievement of the set targets.

In addition, appropriate actions have to be taken in order to ensure improvements within the accounts receivable, inventories and accounts payable. The launch of specific initiatives with quantitative as well as qualitative objectives often is a good way to introduce changes in the culture and business processes. Every element provides its own opportunities for an improvement, and requires more or less sophisticated strategies. With regard to the accounts receivable, the negotiation of the payment terms decisively influences the collection period. Moreover, payment delays and failures can be partly avoided by a profound credit analysis of the customer. Other important issues are consistent monitoring and a strict dunning process. There are alternatives to the conventional handling of the receivables, like factoring or credit insurance. However, the benefits of the outsourcing or insurance have to exceed its costs.

An efficient management of the accounts payable is based on a close monitoring of the payment deadlines and potential trade discounts. As long as no cash discount is offered, the cash outflow should be postponed until the due date. There is no benefit of an earlier cash disbursement, and hence the full credit period should be utilized. Cash discounts should be used, if the benefits from the cash receipt are bigger than the opportunity loss of the cash outlay. Similar to the accounts receivable, the payables level depends on the payment terms. Of course, a longer payment period is favored

this time, in contrast to the receivables management. The negotiating power can be levered through the building of a central hub, i.e. the centralization of all procurement activities. This is especially important in the chemical and pharmaceutical industry, where business-to-business contacts are predominant with regard to sourcing.

The inventories are the most complex element of the working capital, and often require the greatest effort in order for optimization. Moreover, supply chains and corresponding processes may vary substantially between the different firms. It is therefore difficult to provide general suggestions for all companies. A successful strategy has to be developed with regard to the firm's structure and in collaboration with the responsible operations and site managers, among others. Modern inventory management is supported by advanced IT systems, and different scenarios can be simulated with the aid of sophisticated simulation tools (Adams, 2008). However, the volatility of the oil price, and hence of the raw material and energy prices for the chemical industry, remains a challenge in the future. Lean inventory management thus is likely to gain further importance.

Besides the operational excellence, the inventory level also highly depends on the collaboration within the company, and within the entire supply chain. The various involved divisions within the company have to share their information in order to optimize for instance production schedules or safety stock levels. Decisions and strategies should be developed by integrating the sales, supply chain, production and finance view. A holistic view of operating decisions and its consequences is more likely to succeed in the long term. Interdisciplinary, cross-functional teams can be established to intensify the integration.

In addition, the internal view has to be extended to the whole supply chain (Rafuse, 1996). It is not sufficient to cooperate inside the company. Instead, collaboration throughout the entire supply chain should be aimed, which offers considerable opportunities and competitive advantages. True collaboration includes the exchange of information about current and future demand and supply levels, and the working capital levels are intended to be lowered throughout all members of the chain. The reduction through better data exchange and enhanced communication is more sustainable and promises long-lasting benefits. Collaboration leads to more responsive and resilient supply

chains and that in turn results in lower overall inventory requirements and higher efficiency. Therefore, a paradigm shift is required from an internal optimization of the processes to the optimization of the whole supply chain. In the light of the ongoing consolidation and globalization within the chemical and pharmaceutical industry, the supply chain collaboration becomes an increasingly decisive value driver.

The collaboration does not only offer chances for an inventory optimization. Closer and more intense relationships with customers and suppliers may also enable a company to improve its accounts receivable and payable, and eventually to optimize the whole net working capital.

Last but not least, a consistent and ongoing monitoring and controlling ensures sustainable improvements, and can be supported and enhanced by a benchmarking analysis and the adaption of best practices.

Summary

The investigation of Swiss chemical and pharmaceutical companies regarding their working capital management has revealed the huge potential which is lying in the management of short term assets and liabilities. Furthermore, the considerable differences between the single firms show that an optimized working capital management may play an important role for a firm's competitiveness. A successful working capital strategy relies on the commitment and awareness of the management and on efficient working capital practices on the operative level. In addition, internal and external collaboration leads to more competitiveness, both for the firm as well as for the whole supply chain. A consistent and ongoing monitoring ensures sustainable improvements, and can be supported and enhanced by a benchmarking analysis and the adaption of best practices.

References

- Adams, R. (2008): Beyond Forecasting: Responsive Supply Networks. *Journal of Business Chemistry*, **5** (3), pp. 95-99
- Boer, G. (1999): Managing the Cash Gap. *Journal of Accountancy*, **188** (4), pp. 27-32
- Brealey, R., Myers, S. (2005): *Principles of Corporate Finance*, 7. Edition, McGraw-Hill/Irwin
- Budde, F., Felcht, U.-H., Frankemölle, H. (2006): *Value creation – Strategies for the chemical industry*, 2. Edition. Wiley-VCH.
- Christopher, M. (2008): *Logistics and Supply Chain Management - Creating value-adding networks*, 3. Edition. Financial Times / Prentice Hall, Great Britain.
- Ernst & Young (2008): Consumer products industry and working capital management.
- Ernst & Young (2009): Lessons from Change – A changing environment in the life sciences industry.
- Farris, T., Hutchison, P. (2003): Measuring Cash-to-Cash Performance. *The International Journal of Logistics Management*, **14** (2), pp. 83-91
- Jakobi, R. (2001): *Marketing and sales in the chemical industry*, Wiley-VCH, Germany.
- Jose, M., Lancaster, C., Stevens, J. (1996): Corporate Returns and Cash Conversion Cycles. *Journal of Economics and Finance*, **20** (1), pp. 33-46
- KPMG (2008): Reaction – KPMG's Views on Working Capital in the Chemical Industry, KPMG International.
- Losbichler, H., Rothböck, M. (2008): Der Cash-to-cash Cycle als Werttreiber im SCM – Ergebnisse einer europäischen Studie. *Controlling & Management*, **52** (1), pp. 47-57
- Rafuse, M. (1996): Working capital management: an urgent need to refocus. *Management Decision*, **34** (2), pp. 59-63
- Randall, W., Farris, T. (2009): Supply chain financing: using cash-to-cash variables to strengthen the supply chain. *International Journal of Physical Distribution & Logistics Management*, **39** (8), pp. 669-689
- Ross, S., Westerfield, R., Jordan, B. (2008): *Fundamentals of Corporate Finance*, 8. Edition, McGraw-Hill/Irwin.
- Sage, D. (2009): Improving Working Capital – The Next Step in Big Pharma's Transformation Efforts. *Genetic Engineering & Biotechnology News*.
- Shin, H.-H., Soenen, L. (1998): Efficiency of Working Capital Management and Corporate Profitability. *Financial Practice & Education*, **8** (2), pp. 37-45
- Volkart, R. (2006): *Corporate Finance – Grundlagen von Finanzierung und Investition*, 2. Edition, Versus.
- Wagner, S., Locker, A. (2008), Working Capital reduzieren durch Supply Chain Management, *Beschaffungsmanagement*, (9), pp. 6-8